

*AQ Cumulative Impact Analysis  
w/CD Modeling Files*

March 4, 2005



**sierra  
research**

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Connie Bruins  
Compliance Manager  
California Energy Commission  
1515 Ninth Street  
Sacramento, CA 95814-5512

Subject: Amendment of Certification for Inland Empire Energy Center, 01-AFC-017

Dear Ms. Bruins:

On behalf of Calpine, we are pleased to submit the enclosed air quality cumulative impact analysis for the Inland Empire Energy Center (IEEC). As shown in the enclosed analysis, we do not believe that the proposed equipment changes to the IEEC project will result in any new significant cumulative air quality impacts.

If you have any questions or need any additional information, please do not hesitate to call me.

Sincerely,

Gary Rubenstein  
Senior Partner

Enclosure

cc: Keith Golden, CEC  
CEC Dockets Office, Docket #01-AFC-017  
Brewster Birdsall, Aspen Environmental  
Michael Hatfield, Calpine  
Barbara McBride, Calpine  
Jenifer Morris, Calpine  
Mark Smolley, Calpine

<b>DOCKET</b>	
01-AFC-17C	
DATE	MAR 04 2005
RECD.	APR 15 2005

## Cumulative Air Quality Impacts Analysis IEEC Project

The following analysis was performed to determine the cumulative air quality impacts associated with proposed design changes for the IEEC project. This analysis was performed pursuant to the cumulative impact analysis protocol in the 2001 AFC for the IEEC project (see September 2001 AFC, Appendix K8). As discussed below, the cumulative impacts of the proposed design changes and other new/modified emission sources in the project area are not expected to cause a new violation or contribute to an existing violation of any state or federal air quality standard in the project area.

The new and modified emissions sources in the IEEC project area were identified through a request of permit records from the South Coast Air Quality Management District (SCAQMD). The search was requested for new or modified emission sources located within 10 km of the IEEC project site that had a net emission increase of any size for NO<sub>x</sub>, CO, SO<sub>x</sub>, or PM<sub>10</sub>. The database search focused on all new ATCs issued or permit applications filed in the time period from January 2002 to February 2005. This time period was selected based on the typical length of time needed for construction to ensure that new equipment that are not reflected in the 2000-2003 ambient air quality data used for the refined modeling are included in the cumulative impact analysis. Based on the above search criteria, the SCAQMD performed a database search that identified a total of approximately 375 emission sources that had been the subject of a permit application during the requested period. Of this number, only 11 permit actions resulted in net emission increases of NO<sub>x</sub>, CO, SO<sub>x</sub>, or PM<sub>10</sub> and were within 10 km of the IEEC project site. The detailed list of the 375 emission sources is included as Attachment 1. Of these 11 permit actions, only one has a net emissions increase above the 10 lbs/day de minimis level shown in the cumulative impact analysis protocol included in the 2001 AFC for the IEEC project (Pomeroy Corporation). At the request of the CEC air quality staff, two additional emission sources at a concrete batch plant near Romoland (Orco Block Company) were added to the list due to their close proximity to the IEEC site. Consequently, the final list of new/modified sources included in the cumulative impacts analysis is comprised of a total of three emission units.

### Cumulative Emissions Impact

A detailed description of the three new/modified emission sources is included as Attachment 2. This list of new/modified sources includes the company name, company address, distance from the IEEC project site, emission levels, and exhaust stack parameters. The emission levels for the three new/modified sources were provided by the SCAQMD as part of its database search. Because information regarding the exhaust stack characteristics of the sources was not available from the SCAQMD, it was necessary to use default stack parameters for the listed sources. The default stack parameters were derived from the following sources, and these default parameters have been approved by the CEC staff for previous cumulative impact analyses:

- Boiler default stack parameters – based on a 20 MMBtu/hr natural gas-fired boiler at an industrial facility in Fontana.
- Reciprocating internal combustion engine default stack parameters – based on parameters provided by the CEC for a Cummins Diesel engine rated at greater than 500 hp.
- Cement molding machine baghouse – based on a baghouse installed on a cement storage silo at a Portland cement plant in Davenport, California.

The emission characteristics and stack parameters for the proposed IEEC project are discussed in detail in the air quality impact section of the March 2005 CEC Amendment Number 1, and will not be repeated here.

Using the methodologies outlined above, emissions were calculated on an hourly, daily, and annual basis for the IEEC project and the three new/modified sources. Tables 1, 2, and 3 show the hourly, daily, and annual emissions, respectively, for the IEEC project and three listed new/modified sources. The maximum hourly combined NOx emission level of 816 lbs/hr for the gas turbines shown in Table 1 is higher than the 550 lbs/hr shown in the March 2005 CEC Amendment Number 1. This increase in the allowable startup NOx emission level for the gas turbines is a result of a revised startup modeling analysis done in response to a recent CEC staff information request. Additional details regarding this revised modeling approach are discussed below. As discussed above, the detailed emission summary for the three listed new/modified sources is included as Attachment 2.

**Table 1**  
**Maximum Hourly Emissions from Sources Included in Cumulative Impacts Analysis**  
**(lbs/hr)**

<b>Emissions Source</b>	<b>NOx</b>	<b>CO</b>	<b>SOx</b>	<b>PM<sub>10</sub></b>
IEEC Gas Turbines (startup/commissioning)	816.0	794.2	3.7	20.0
IEEC Other Equipment	43.1	12.1	1.1	4.8
IEEC Project Total	859.1	806.3	4.8	24.8
3 New/Modified Sources	0.7	0.6	0.0	0.2

**Table 2**  
**Maximum Daily Emissions from Sources Included in Cumulative Impacts Analysis**  
**(lbs/day)**

<b>Emissions Source</b>	<b>NOx</b>	<b>CO</b>	<b>SOx</b>	<b>PM<sub>10</sub></b>
IEEC Project	2,565.9	1,394.5	96.4	591.8
3 New/Modified Sources	17.0	15.0	1.0	5.0

**Table 3**  
**Maximum Annual Emissions Included in Cumulative Impacts Analysis**  
**(tons/year)**

<b>Emissions Source</b>	<b>NO<sub>x</sub></b>	<b>CO</b>	<b>SO<sub>x</sub></b>	<b>PM<sub>10</sub></b>
IIEC Project	214.6	188.8	16.2	104.2
3 New/Modified Sources	3.1	2.7	0.2	0.9

#### Analysis of Ambient Impacts

As with the refined modeling included in the March 2005 CEC Amendment Number 1, the Industrial Source Complex Short Term (ISCST) and CTSCREEN dispersion models were used to evaluate the combined impacts for the IIEC project and the three new/modified sources. The models were used with meteorological data collected during 1981 at the nearby Riverside monitoring station. The SCAQMD has previously determined that this meteorological data set is representative of meteorological conditions in the IIEC project area. The coarse receptor grid used for the refined modeling performed for the IIEC project was also used for the cumulative impact analysis. A description of this receptor grid is included in the 2001 AFC for the IIEC project (AFC Section 5.2.3.2.2). Enclosed as Attachment 3 is a compact disk containing the modeling input and output files.

The new emissions sources associated with the IIEC project were modeled as individual point sources, using the stack parameters and emission rates included in the March 2005 CEC Amendment Number 1. The three new/modified sources were also modeled as individual point sources based on the emission levels and stack characteristics shown in Attachment 2.

The maximum modeled concentrations for each pollutant and averaging period from all sources combined are shown in Table 4, along with the individual contribution of the IIEC project and the three new/modified sources. For the IIEC project, Table 4 shows the maximum project impacts at any receptor location and the maximum project impact at the receptor location where the maximum cumulative impacts occur. The IIEC project maximum 1-hr NO<sub>2</sub> impacts in Table 4 are different than the impacts shown in the March 2005 CEC Amendment Number 1 due to a change from individual to source-group ozone limiting method (OLM) corrections to the 1-hr NO<sub>2</sub> modeled impacts. This change in the OLM correction method was recommended in a recent CEC staff information request for the IIEC project. The change in the OLM correction method enabled an increase in the allowable combined NO<sub>x</sub> emissions for the gas turbines during startups as shown above in Table 1. The maximum modeled cumulative concentrations are summarized in Table 5 and compared with the state and federal ambient air quality standards.

As shown in Table 4, at the point of maximum combined impact there is very little overlap between the IIEC project and the three new/modified sources. For all of the pollutants and averaging periods, the three new/modified sources' contribution at the

point of maximum combined impact is almost nondetectable by the ISCST3/CTSCREEN models. The modeling results show that the maximum combined impacts of the IEEC project and the three new/modified projects are not expected to cause any violations of the state or federal CO, SO<sub>2</sub>, or NO<sub>2</sub> standards. In addition, the modeled PM<sub>10</sub> impacts by themselves are well below federal and state ambient air quality standards. However, since the federal and state PM<sub>10</sub> standards are already exceeded in the area, any increase in ambient PM<sub>10</sub> levels will contribute to an existing violation. From the information about source contributions in Table 4, it can be seen that these projected violations would occur even without the proposed IEEC project. In addition, under the SCAQMD permitting program, the IEEC is required to offset all net emissions increases. Consequently, the IEEC project is not expected to cause a new violation or contribute to an existing violation of any state or federal air quality standard in the project area.

**Table 4**  
**Source Contribution to Maximum Modeled Concentration**  
**(all concentrations in ug/m<sup>3</sup>)**

Pollutant/ Avg. Period	Maximum Modeled Impact for IEEC Project	Maximum Modeled Impact for 3 New/Modified Sources	Combined Maximum Modeled Impact for IEEC Project and 3 New/Modified Sources	IEEC Project's Contribution to Point of Maximum Combined Impact
NO <sub>2</sub>				
- annual	0.8 <sup>a,b</sup>	0.2 <sup>a,b</sup>	0.8	0.8
- 1 hour	197.5 <sup>c,d</sup>	4.8 <sup>c,d</sup>	197.5	197.5
CO				
- 8 hours	473.8 <sup>c</sup>	2.0 <sup>c</sup>	473.9	473.8
- 1 hour	814.7 <sup>c</sup>	3.5 <sup>c</sup>	815.3	814.7
SO <sub>2</sub>				
- annual	0.2 <sup>c</sup>	0.0 <sup>c</sup>	0.2	0.2
- 24 hours	2.4 <sup>c</sup>	0.1 <sup>c</sup>	2.4	2.4
- 1 hour	58.1 <sup>c</sup>	0.3 <sup>c</sup>	58.1	58.1
PM <sub>10</sub>				
- annual	1.3 <sup>c</sup>	0.5 <sup>c</sup>	1.3	1.3
- 24 hours	9.1 <sup>c</sup>	3.9 <sup>c</sup>	9.1	9.1
PM <sub>2.5</sub>				
- annual	1.3 <sup>c</sup>	0.5 <sup>c</sup>	1.3	1.3
- 24 hours	9.1 <sup>c</sup>	3.9 <sup>c</sup>	9.1	9.1

Notes:

- a. Modeled using CTSCREEN
- b. ARM corrected using EPA correction factor of 0.75
- c. Modeled using ISCST3
- d. OLM corrected using source-group approach

**Table 5**  
**Comparison of Maximum Modeled Concentrations with**  
**Ambient Air Quality Standards**  
**(all concentrations in ug/m<sup>3</sup>)**

Pollutant/ Avg. Period	Max. Modeled Impact from All Sources	Background Concentration	Total	Federal Standard	State Standard
NO <sub>2</sub>					
- annual	0.8	34	35	100	--
- 1 hour	197.5	171	369	--	470
CO					
- 8 hours	473.9	5,126	5,600	10,000	10,000
- 1 hour	815.3	8,010	8,825	40,000	23,000
SO <sub>2</sub>					
- annual	0.2	5	5	80	--
- 24 hours	2.4	31	33	365	109
- 1 hour	58.1	50	108	--	650
PM <sub>10</sub>					
- annual <sup>a</sup>	1.3	45	46	50	20
- 24 hours	9.1	116	125	150	50
PM <sub>2.5</sub>					
- annual	1.3	30	31	15	12
- 24 hours	9.1	77	86	65	--

Notes:

- a. Annual arithmetic mean

**ATTACHMENT 1**

**SCAQMD DATABASE SEARCH FOR NEW/MODIFIED EMISSION SOURCES**



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**ATTACHMENT 2**

**EMISSION LEVELS AND STACK PARAMETERS  
FOR THREE NEW/MODIFIED SOURCES**

Cumulative Impact Modeling Inputs - IEEC Project																		
Facility LD Number	Facility Name	Facility Address	City	State	Zip	Application Number	Description of New/Modified Emission Source		Type of Permit Activity	Net Emissions Increase(1)				Default Stack Height(2) (meters)	Default Stack Diameter(2) (meters)	Default Exhaust Temperature(2) (°C)	Default Exhaust Flow(2) (m³/sec)	
67686	ORCO BLOCK CO	26380 PALOMAR RD	RONOLAND	CA	92586	432413	BOILER (<5 MMBTU/HR) NAT GAS ONLY		New equipment	lb/hr lb/day lb/yr	0.25 6.00 2,180.00	0.13 3.00 1,085.00	CO NOx SOx PM10	0.00 0.00 0.00 0.00	10.67	0.50	412	11.58
67686	ORCO BLOCK CO	26380 PALOMAR RD	RONOLAND	CA	92586	402816	CONCRETE MOLDING		Modified equipment	lb/hr lb/day lb/yr	0.00 0.00 0.00	0.00 0.00 0.00	CO NOx SOx PM10	0.00 0.00 4.00 1,460.00	6.09	0.51	294	8.43
141807	POMEROY CORPO	2020 GOETZ RD	PERRIS	CA	92570	433807	1.C. ENGINE ASSOCIATED WITH A CONCRETE BATCH SYSTEM		New equipment	lb/hr lb/day lb/yr	0.38 9.00 3,285.00	0.58 14.00 5,110.00	CO NOx SOx PM10	0.04 1.00 365.00 365.00	9.14	0.30	650	33.00

Notes:

1. Emissions based on daily emission levels provided by the SCAQMD. Hourly emissions are based on 24 hr/day of operation. Annual emissions are based on 365 days/year of operation.
2. Default stack parameters were approved by the CEC for the previous IEEC cumulative impact modeling analysis. For the concrete modeling unit, the default material processing stack parameters were used.

**ATTACHMENT 3**

**AIR QUALITY CUMULATIVE IMPACT MODELING CD**